APPENDIX C

TO EXHIBIT 1

The Honorable Susan E. Dudley
Administrator
Office of Information and Regulatory Affairs
Office of Management and Budget
Washington, DC 20503

June 29, 2007

RE: RIN: 0651-AB93
TITLE: *Changes to Practice for Continuing Applications, Requests for Continued Examination Practice, and Applications Containing Patentably Indistinct Claims* (*"Continuations Rule"*)

RIN: 0651-AB94
TITLE: *Changes to Practice for the Examination of Claims in Patent Applications* (*"Limits on Claims Rule"*)

Dear Administrator Dudley:

I am an inventor and an entrepreneur who has used the US patent system for a quarter of a century. I am writing to express my deep concerns about the above captioned proposed rules, now under review by the Office of Management and Budget ("OMB"), which were submitted by the U.S. Patent and Trademark Office ("USPTO"). Both rules were published in a Notices of Proposed Rulemaking for public comment on January 3, 2006 [1] ("NPRM"), and have been the subject of several public meetings in which senior USPTO officials actively participated.[2] Despite the fact that the USPTO received hundreds of public comments highly critical of both proposals[3], these rules were subsequently submitted to OMB. Therefore, I have no reason to believe that the final proposed rules (which have not been made public) are substantially different from the NPRM.

Since the USPTO proposed these rules, I have spent some time studying the underlying economic attributes and trends of the various patent application types filed with the USPTO. My report on these studies and on related patenting trends was recently published in an intellectual property conference in a paper[4] that I shall refer to throughout this memo as the "Katznelson (2007)" paper. The paper and its accompanying slides are attached to this memo and their entire content is incorporated herein by this reference. In the following sections, I show why the proposed USPTO rules are economically significant under a presidential executive order and why the USPTO failed to adhere to other provisions of that executive order, including but not limited to failure to consider other alternatives to its proposed rules.

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[1] USPTO Docket No. 2005-P-066, Notice of Proposed Rulemaking "*Changes to Practice for Continuing Applications, Requests for Continued Examination Practice, and Applications Containing Patentably Indistinct Claims*", 71 *Fed. Reg.* 48, (January 3, 2006); USPTO Docket No. 2005-P-067, Notice of Proposed Rulemaking, "*Changes to Practice for the Examination of Claims in Patent Applications*", 71 *Fed. Reg.* 61, (January 3, 2006).

[2] The USPTO's web page on these rules, http://www.uspto.gov/web/offices/pac/dapp/opla/presentation/focuspp.html, lists 19 "Town Hall" meetings.

[3] USPTO Docket No. 2005-P-066, Comments on the NPRM. At http://www.uspto.gov/web/offices/pac/dapp/opla/comments/fpp_continuation/continuation_comments.html.

[4] R.D. Katznelson, Patent Continuations, Product Lifecycle Contraction and the Patent Scope Erosion – A New Insight Into Patenting Trends, *Southern California Law Associations Intellectual Property Spring Seminar*, Laguna Niguel, CA, (June 8-10, 2007).

I also show that in providing inadequate material and flawed influential information in support of its proposed rules, and in withholding other essential information, the USPTO failed to comply with the Federal Information Quality Act.

1 THE PROPOSED RULES ARE ECONOMICALLY "SIGNIFICANT REGULATORY ACTION" UNDER EXECUTIVE ORDER 12,866

Section 3(f) of Executive Order 12,866[5], (the "EO"), defines in pertinent part ''*Significant Regulatory Action*'' as any regulatory action that is "likely to result in a rule that may have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities." I show below that ***any one*** of the rules proposed by the USPTO meets the test for being economically significant because:

(a) They each may have an annual effect on the economy of $100 million or more;

(b) They each may adversely affect in a material way the economy, and in particular, those sectors of the economy that develop and rely on technical innovation and intellectual property.

Others have provided OMB/OIRA with background of the two rules, and certain thresholds for average patent value that, if exceeded, would render either of the rules "economically significant." I present some of the results in the literature, and some new results, that show that these thresholds are exceeded, by a substantial factor. Even my most conservative estimate places the economic effect of both rules at nearly $600 Million per year, once the rules are in full effect.

1.1 Continuations Rule

The Continuations Rule provides that a priority claim for benefit under 35 U.S.C. §120, §121 or §365(c) would be limited to "only a single prior filed application". It proposed that the USPTO will refuse to enter, or will delete if present, any specific reference to the prior-filed application that is not permitted by this new rule. Thus, only one continuation will be permitted under this proposal. The NPRM provides for exceptions but only by petition "showing to the satisfaction of the Director [of the USPTO] that the amendment, argument, or evidence could not have been submitted during the prosecution of the prior-filed application". Presumably under the proposed rules, absent such satisfactory showing (for which the criteria or standards are conspicuously missing from the NPRM), a grant of exception would be denied. In justifying these and other related proposals, the NPRM proffers by statements, citations and analysis that the USPTO is actually attempting to directly achieve the results of (i) minimizing USPTO processing of old applications in favor of new applications and (ii) compelling applicants to advance an originally filed application to final agency action. It must therefore be assumed that, to a first order of analysis, the rules are intended to practically eliminate applicants' second or subsequent continuation application. To the extent that claims in these applications would have been

[5] Executive Order 12866, Regulatory Planning and Review, **58** *Fed. Reg.* 51735, (October 4, 1993). Executive Order 12866 was recently amended by Executive Order 13422, **72** *Fed. Reg.* 2763, (January 23, 2007), with no substantive change in the parts pertinent to this memo. However, because the USPTO may argue that it analyzed and proposed its rules prior to such amendment, this memo refers to terms and language in the original 1993 order.

otherwise issued in a patent, this rule would deny the applicant from obtaining a valuable patent. In order to assess the impact of such loss of patent protection, the value of issued patents is examined below.

1.1.1 Estimates of average patent value

Several attempts to value patents have been undertaken by economic and intellectual property scholars. A value of a patent depends on many factors including the market share and position of the products it protects, the opportunity to license it widely, the life remaining under its term and the degree to which its claims can be designed around - just to name a few of the factors. An example of a tool and econometric method to value patents that takes into account the remaining life, the market share and the industry to which a focal patent pertains to, was described by Rick Neifeld. He used this tool over a sample of patents and obtained a mean patent valuation of about $2.1 to $2.5 million for patents issued from 1990 to 1993[6].

In the present analysis, however, a more conservative approach is taken by using the *implied* value of patents based on their renewal statistics and the associated renewal fees that their owners paid to maintain the patents in force. This valuation approach assumes that individual patent decision makers will, on average, choose to pay patent maintenance fees only when the perceived value of the expected remaining economic benefit secured by the patent exceeds the amount of the maintenance fee, taking into account appropriate risk factors, anticipated rates of return, etc[7]. Jonathan Barney recently implemented such patent valuation method[8]. In his analysis, Barney finds that the value of patents is best described by a lognormal distribution. He finds that for a sample population of 70,000 patents issued in 1986, the bottom 10% of patents (the tenth percentile and below) had an implied value at issuance equal to or less than about $430. The top 10% of patents (ninetieth percentile and above) had an implied value greater than about $112,500. The median value was $6,930 and the mean value was $73,340. This indicates that patent values have a highly skewed distribution, with the majority of patents being less valuable than their cost to prepare, file and prosecute to issuance. However, because of a minority of valuable patents, the *expected* value (mean value) of a patent exceeds the average cost to obtain it, which is why patent applications are filed in the first place.

The analysis that follows is also conservative in that it does not adjust upwards the average patent value given by Barney in 1986 dollars. Furthermore, no upward adjustment is made to account for the fact that the patents being valued are issued from 2nd or later continuations, a patent class having patents known to be more valuable than the average patent.[9]

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[6] R.A. Neifeld, A Macro-Economic Model Providing Patent Valuation and Patent Based Company Financial Indicators, *Journal of the Patent. & Trademark Office Society*, **83**, p. 211, (2001).

[7] *See e.g.* H.C. Peterson and W.C. Lewis, *Managerial Economics*, pp. 511-512, 4th Edition, Prentice Hall PTR, (1998) (Generally accepted economic theory holds that individuals and companies will invest in an asset only when the perceived value of the expected economic benefits secured by the asset exceeds the anticipated investment required to obtain or maintain the asset, or both to obtain and maintain the asset, taking into account appropriate risk factors, anticipated rates of return, and related considerations).

[8] J.A. Barney, A Study Of Patent Mortality Rates Using Statistical Survival Analysis To Rate And Value Patent Assets, *AIPLA Quarterly Journal*, **30**(3), pp. 317-352 (September 2002).

[9] Barney (2002), note 8, (showing that patent maintenance rates generally increase with the number of recorded priorities to related cases. In a sample population of 100,000 Patents granted in 1996, patents that made no priority claim to an earlier filed related case, had an observed fourth-year maintenance rate of 83.1%, compared to 92.4% for patents with five or more related cases, down to 87.8%, for patents with only one related case). *See also* related findings by: K.A. Moore, Worthless Patents, *Berkeley Technology Law Journal*. **20**(4), p.1521, (Fall 2005) (showing in Table 6 that the average number of related applications for patents issued in 1991 and expired at the 4-year, 8-

1.1.2 Economic Impact Associated with Patents Issued From 2nd or Later Continuations

Slide 56 of the Chicago Town Hall presentation depicts USPTO's data for continuation application filing rate broken down by (i) first filed continuation and CPA/RCE applications and (ii) 2nd or later continuation and CPA/RCE. The embedded Excel spreadsheet in this slide provides the tabulation of the data for fiscal years 2001 through 2005. By combining the application numbers for 2nd or later continuations and 2nd or later CPA/RCE, one obtains the total 2nd or later continued examination applications. These totals are shown for FY 2001-2005 in the "Actual" segment of Table 1. The estimates are even more conservative because these applications do not include Continuations In Part ("CIP") or divisional applications,. The projected number of applications for fiscal years later than 2005 were obtained by extrapolating from the exponential growth regression of the "Actual" USPTO data. The regression growth rate was 10.5% per year. A model of continuation patent grant was based on the pendency distribution shown in Figure 3 quantized by year, wherein the number of issued patens $G(t)$ in year t is given by

$$G(t) = g\,[3A(t)+4A(t-1)+3A(t-2)]/10$$

In the equation above, $A(t)$ is the application count for year t and g is the application grant rate. In this model, a 77% grant rate was assumed, consistent with a recent measurement of the USPTO grant rate[10].

	FY	2nd+ App. Filed (a)	Patents Issued	Economic Value	USPTO Revenue PV
Actual	**2001**	**10,733**	Rate 0.77	Average Patent Value	Patent Efficiency
	2002	**12,688**			
	2003	**12,964**			
	2004	**14,027**	$ / Unit	$73,340	$3,877
	2005	**16,781**	Source:	(b)	(c)
Projected	2006	17,916	(Units)	(Millions)	
	2007	19,789	13,966	**$1,024**	$54.1
	2008	21,858	15,283	**$1,121**	$59.3
	2009	24,142	16,880	**$1,238**	$65.4
	2010	26,666	18,645	**$1,367**	$72.3
	2011	29,453	20,594	**$1,510**	$79.8
	2012	32,532	22,746	**$1,668**	$88.2
	2013	35,932	25,124	**$1,843**	$97.4
	2014	39,688	27,750	**$2,035**	$107.6
	2015	43,837	30,651	**$2,248**	$118.8
	2016	48,419	33,854	**$2,483**	$131.3
	2017	53,480	37,393	**$2,742**	$145.0

Table 1. The economic impact of patents issued from 2nd or later continued examination applications. *Sources*: (a) "Actual" - USPTO Chicago Town Hall Presentation, Slide 56; "Projected" – exponential growth regression model based on "Actual"; (b) Barney (2002), note 8; (c) USPTO, 2006 Annual Report, at 22, patent efficiency chart.

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year and 12-year renewal times were 0.27, 0.3, 0.34 respectively and those renewed to full term had 0.38 related applications).

[10] R.D. Katznelson, Bad Science in Search of "Bad" Patents, *Federal Circuit Bar Journal*, **17**(1), pp.__, accepted for publication, (August 2007) (showing that the patent grant rate must not be confused with the output allowance rate, which has recently been lower than the grant rate).

As Table 1 shows, even in the first year of the implementation of the rule, the aggregate value of the patents that would otherwise issue from the applications subject to the Continuations Rule would exceed by an order of magnitude the EO's threshold of $100 Million. By the fifth year, the impact will exceed $1.5 Billion. Therefore, right from the start, the proposed Continuation Rule constitutes an economically *Significant Regulatory Action* under the EO.

As further seen in the Table 1 under the "USPTO Revenue Present Value" column, the rules will also deny the USPTO a significant amount of revenue that it would otherwise have from these continuation applications. The revenue per patent shown is based on the assumption that the patent production cost estimated by the USPTO is recovered by charging user fees and maintenance fees, thereby accounting for them as USPTO revenue in present value terms. It should be noted that these USPTO revenues are the most profitable because, as discussed in Section 3.1.2, continuations require significantly reduced resources to dispose of as compared with the average patent. Moreover, the values shown are conservative estimates based on average revenues but USPTO patent maintenance revenues are the highest from patents issued from 2nd and later continuations. In a remarkable business irony, the USPTO is proposing to terminate its most profitable product. Finally, these projections did not consider the adverse effects of such USPTO revenue cuts (which cannot be restored without congressional action to increase user fees) on patent quality or pendency.

1.1.3 Economic Impact Associated with Patents Issued From 3rd or Later Continuations

	FY	3rd+ App. Filed (a)	Patents Issued	Economic Value	USPTO Revenue PV
Actual	**2001**	**3,049**			
	2002	**3,616**	Rate	Average	Patent
	2003	**3,856**	0.77	Patent Value	Efficiency
	2004	**3,784**	$ / Unit	$73,340	$3,877
	2005	**4,509**	Source:	(b)	(c)
Projected	2006	4,786	(Units)	(Millions)	
	2007	5,199	3,717	**$273**	$14.4
	2008	5,648	4,012	**$294**	$15.6
	2009	6,136	4,358	**$320**	$16.9
	2010	6,665	4,734	**$347**	$18.4
	2011	7,240	5,143	**$377**	$19.9
	2012	7,865	5,587	**$410**	$21.7
	2013	8,544	6,069	**$445**	$23.5
	2014	9,282	6,593	**$484**	$25.6
	2015	10,083	7,162	**$525**	$27.8
	2016	10,953	7,780	**$571**	$30.2
	2017	11,899	8,451	**$620**	$32.8

Table 2. The economic impact of patents issued from 3rd or later continued examination applications. *Sources*: (a) "Actual" - USPTO Chicago Town Hall Presentation, hidden spreadsheet data in Slide 56; "Projected" – exponential growth regression model based on "Actual"; (b) Barney (2002), note 8; (c) USPTO, 2006 Annual Report, patent efficiency chart at 22.

Rumors have circulated regarding USPTO's exploration of a relaxed version of the Continuations Rule wherein limits would be imposed only on the 3rd and later continuations. The USPTO has not confirmed the rumors and has not released any details as to the number of such applications filed each year. It has not solicited public comments about such possible rules. However, unlike the graphical bar chart in Slide 56 of the Chicago Town Hall presentation, the hidden embedded Excel spreadsheet actually does contain previously undisclosed numerical data for the 3rd and later continuation applications for fiscal years 2001-2005. I have used the hidden data by combining CPA/RCE and continuations numbers of the 3rd and later continued examination applications in an analysis similar to that of the previous table and the results are presented in Table 2. As this table shows, the aggregate value of patents that would otherwise issue from the applications subject to this "benign" rule would exceed by a substantial factor the EO's threshold of $100 Million. Therefore, even this relaxed Continuations Rule is an economically *Significant Regulatory Action* under the EO.

1.2 Limits on Claims Rule

The proposed Limits on Claims Rule would limit to 10 the number of independent or representative claims that USPTO will initially examine without submission by the applicant of an Examination Support Document. In the preamble to the Limits on Claims NPRM, the USPTO estimated that 1.2% of patent applications would be affected by the rule. The earliest adoption of the rules will affect FY 2007, which according to USPTO estimates based on FY 2005 discussed below will see $384{,}228 \times (1.081)^2 = 449{,}825$ new applications filed. Therefore, USPTO projections are that there will be 449,825 x 0.012 = 5,398 new applications affected in FY 07. At a 77% patent grant rate and an average patent value of $73,340, the economic impact is expected to be $5{,}398 \times 0.77 \times 73{,}340 \approx \$305M$, significantly exceeding the EO threshold. It should be noted that here too, the valuation is conservative because no upward adjustment is made to account for the fact that patents issued with high number of claims are known to be more valuable than the average patent.[11]

2 THE USPTO FAILED TO COMPLY WITH THE INFORMATION QUALITY ACT AND OMB'S IMPLEMENTING GUIDELINES

The Federal Information Quality Act[12] and OMB's government-wide Information Quality Guidelines[13] under that act directed government agencies to adopt information quality standards. The USPTO issued its own guidelines implementing OMB's guidelines taking into account its particular needs.[14] Both OMB's and USPTO's guidelines require that information USPTO disseminates satisfy applicable quality standards. The standards relevant to these proposed rules are *utility*[15], *reproducibility*[16] and *objectivity*[17]. The USPTO's definitions of these terms follows the definitions established by OMB. In addition, because the information in question constitutes the agency's basis for regulatory decision-making, it is inherently influential.[18] As shown below, in its various omissions, the USPTO has failed to adhere to the letter and spirit of the Information Quality Act and OMB's government-wide Information Quality Guidelines.

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[11] Barney (2002), note 8, (showing in Figure 4 that patent maintenance rates strongly increase with the number of independent claims).

[12] Pub. L. 106-554, Section 515.

[13] Office of Management and Budget, "Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies; Notice; Republication, **67** *Fed. Reg.* 8452-8460, (Feb. 22. 2002).

[14] USPTO, "Information Quality Guidelines," online at http://www.uspto.gov/web/offices/ac/ido/infoqualityguide.html .

[15] "Utility" refers to the usefulness of the information to its intended users, including the public. In assessing the usefulness of information that the agency disseminates to the public, the agency considers the uses of the information not only from its own perspective but also from the perspective of the public (Sec. 6(b)).

[16] "Reproducibility" means that the information is capable of being substantially reproduced, subject to an acceptable degree of imprecision. For information judged to have more (less) important impacts, the degree of imprecision that is tolerated is reduced (increased). With respect to analytical results, "capable of being substantially reproduced" means that independent analysis of the original or supporting data using identical methods would generate similar analytical results, subject to an acceptable degree of imprecision or error (Sec. 7).

2.1 The USPTO failed to provide information required by the public to assess and comment on its proposed rules.

The USPTO has made limited data available for the public to review in preparing its public comments. Data consists of selected tables[19] and an 85-slide PowerPoint presentation widely referred to as the Chicago Town Hall Slides.[20] The stated problem the USPTO intends to remedy is rising application backlog and rising share of continuations among all patent applications[21]. Slides 50-54 of the Chicago Town Hall presentation display the USPTO's forecasts of patent pendency under six alternative scenarios, presumably based on unspecified production gain calculations, the result of which were presented in Slide 29. In providing these charts, there appeared to be no USPTO intent to enable the public to treat it numerically because only graphs with no data tabulations were provided. For example, the key intermediate result is the expected application workload reduction or production gain that the USPTO expects to obtain by adopting the proposed rules. These were shown in a bar graph in Slide 29 of the Chicago Town Hall presentation. In an attempt to reconstruct the numerical data behind that graph, the public must engage in detailed graphical measurements of the heights and scale in this graph. Such an attempt is presented in Table 3 below for the scenarios before and after the rules changes.

The table below is an attempt to ***infer*** from the USPTO graphics the numerical values indicating what the USPTO believes it will gain due to its proposed rules. The inferred numerical data is subject to graphical presentation and measurement errors. The USPTO imposed on the public needless investment of time in reverse engineering its charts only to obtain data that might be an unreliable estimate of the data used by the USPTO.

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[17] Objectivity" involves two distinct elements, presentation and substance. The presentation element includes whether disseminated information is being presented in an accurate, clear, complete, unbiased manner, and within a proper context. Sometimes, in disseminating certain types of information to the public, other information must be disseminated in order to ensure an accurate, complete, and unbiased presentation. Sources of the disseminated information (to the extent possible, consistent with confidentiality protections) and, in a scientific, or statistical context, the supporting data and models need to be identified, so that the public can assess for itself whether there may be some reason to question the objectivity of the sources. Where appropriate, supporting data shall have full, accurate, transparent documentation, and error sources affecting data quality shall be identified and disclosed to users. The substance element focuses on ensuring accurate, reliable, and unbiased information. In a scientific, or statistical context, the original or supporting data shall be generated, and the analytical results shall be developed, using sound statistical and research methods. If the results have been subject to formal, independent, external peer review, the information can generally be considered of acceptable objectivity (Sec. 6(a)).

[18] "Influential" information is defined by USPTO as "information that will have or does have clear and substantial impact on important public policies or important private sector decisions consisting primarily of statistical information on USPTO filings and operations."

[19] See http://www.uspto.gov/web/offices/pac/dapp/opla/presentation/laiplabackgroundtext.html.

[20] See, http://www.uspto.gov/web/offices/pac/dapp/opla/presentation/chicagoslides.ppt (PowerPoint) and (http://www.uspto.gov/web/offices/pac/dapp/opla/presentation/chicagoslidestext.html (HTML).

[21] The USPTO presented no basis upon it relies when it seeks to reduce the share of continuations. It has never provided any reason or authority that would suggest that the rising share of continuations is undesirable, or adverse to the public interest. Indeed, if a rising continuation share is a problem the USPTO seeks to remedy, it failed to explain why it would not limit ***any*** continuation to achieve that "desired" goal.

FY	Measured Bar Height (Inches)		Measured Scale	Inferred Production Units		Inferred Production Gain (units)	Inferred Production Gain (%)
	1,000 Hires & Lower Attrition Rate	Plus Claims and Continuation Limits		1,000 Hires & Lower Attrition Rate	Plus Claims and Continuation Limits		
2006	1.69	1.74	400,000	311,551	314,851	3,300	1.1%
2007	2.18	2.31	= 6.06"	343,894	352,475	8,581	2.5%
2008	2.62	2.89		372,937	390,759	17,822	4.8%
2009	3.25	3.55	Base at	414,521	434,323	19,802	4.8%
2010	3.92	4.25	200,000	458,746	480,528	21,782	4.7%

Table 3. Reverse reconstruction of the data behind the USPTO "Production" prediction bar graph in Slide 29.

If the USPTO truly believed that the public is entitled to scrutinize and numerically analyze its data, why would it withhold the numerical data conveyed in the charts that it released? What purpose and utility did the USPTO envision for releasing these graphical charts without the numerical values? How did it expect the public to use it? From the fact that the USPTO used a projected production bar chart having a graph origin at 200,000 units rather than zero, it is clear that USPTO intended to graphically accentuate the small (4.8%) numerical production gains that it projects due to both the Limits on Claims and the Continuation rules. Nowhere in the NPRM or in the 85 slides of the Chicago Town Hall presentation, did the USPTO disclose the numerical fact that both rules are at best expected to gain only 4.8% in USPTO production capability.

One can logically arrive at the conclusion that the USPTO expected ***no one*** to actually numerically analyze its presentations. This conduct can only be reasonably attributed to a perception at the USPTO that ***no one*** outside the USPTO is ***entitled*** to receive or analyze its information. Then why show these charts in the first place? Here again, the only logical conclusion I arrive at is that the USPTO wanted only to convey ***under the imprimatur of having done extensive analysis*** the message "*Trust us, we know this stuff inside and out, we analyzed it from A to Z, and these rules are the only way to go!*" This is precisely the type of agency practice that the Federal Information Quality Act was intended to eradicate.

Suppose in the alternative that the benefit of doubt is given to the USPTO and that one attributes the missing numerical data of many graphs to an innocent data release error at the USPTO. In that case, how should the public analyze the purported production gains when the gains due to Limitations on Claims Rule and Continuations Rule are lumped together? For example, if the USPTO projects for the Continuations Rules a production gain of only 1% out of the 4.7% total gain it projects for FY 2010, would it be advisable to adopt the Continuations rules? Moreover, the details behind these scenarios, including the modeling that the USPTO performed to construct the scenario curves, have not been disclosed by USPTO.

A central element required to assess USPTO's forecasts is the underlying model it adopted to predict the growth of various patent applications types and their respective service time. However, the only parameter the USPTO disclosed in its presentation was that it predicts an ***aggregate*** application annual growth rate of 8.1%. The numerical decimal precision of this number suggests it was based on some calculation but the USPTO refrained from disclosing the model. Because the proposed Continuations Rule was purported to affect only continuation applications filing rate but not that of original applications, at least the following information is required in order to assess the proposed rule's effect on overall pendency:

1) The assumed growth model for first continuations
2) The assumed service (examination to disposal) time for first continuations
3) The assumed growth model for second or more continuations
4) The assumed service (examination to disposal) time for second or more continuations
5) The assumed growth model for original applications
6) The assumed service (examination to disposal) time for original application
7) The assumed changes in the models above as a result of adoption of the proposed rules
8) The assumed rate of applicants' appeals in response to USPTO refusal of second continuations.
9) The assumed pendency of such appeals

Similarly, in order to assess the impact on USPTO workload from the proposed Limits On Claims Rule, one must at least have a model of the examiner-hour workload per claim and an articulated assumption as to the increase in the number of applications that will be filed in response to this rule. In their effort to submit claims the submission of which would otherwise exceed the new limit on claims in a single application, applicants are likely to file multiple applications to achieve their protection goals with multiple independent claims.

To have properly considered the merits and the effect of the proposed rules, the USPTO must have had to construct such models but it has failed to disclose information on the models it used. To independently analyze the adequacy of USPTO models, the forecasts it produces and to be able to *reproduce* them, the public must have access to the data and models that the USPTO used to derive them. However, the USPTO's forecasts and its conclusions about the efficacy of the proposed rules in reducing pendency are presented without documentation in any of the areas listed above. Therefore, the forecast data have no *utility* for the regulated public; are not *reproducible*; and cannot satisfy the presentational *objectivity* test because the forecasts were not presented in "an accurate, clear, complete, unbiased manner, and within a proper context." In that way, the USPTO failed to comply with Sec. 6(a) of the implementing guidelines of the Information Quality Act.

2.2 USPTO's scientific information dissemination is virtually non-existent.

The USPTO publishes some raw statistical data. However, very little information that it collects, aggregates and analyzes based on data from its internal databases is published in USPTO publications or in scientific and technical journals. In contrast, in recent years, its international counterpart offices appear more forthcoming and helpful in providing technical and scientific data on the characteristics of the processes by which they operate, their patent systems and the statistical attributes of the patents they issue. For example, in the technical areas that relate to this NPRM, a small sample of the European Patent Office ("EPO") or EPO's staff publications includes the following topics: Detailed description of the EPO patent application forecasting system[22] of the kind that could address the projection issues raised in Section 3.1; EPO patent application pendency models[23]; and EPO patent characteristics[24,25] that can be used to assess

[22] P. Hingley, M. Nicolas, Methods for forecasting numbers of patent applications at the European Patent Office, *World Patent Information* **26**, pp. 191–204, (2004) (describing in detail the forecasting methods that have been used routinely at the EPO including trend analyses; a transfer model that uses First Filings as an indicator of EPO filings one year later; and regular surveys of applicants to determine their future intentions).

[23] D. Harhoff, S. Wagner, Modeling the Duration of Patent Examination at the European Patent Office, *Working Paper Presentation*, LMU Munich, (November 2003) at http://www.merit.unimaas.nl/epip/papers/Harhoff_Wagner_Pres.pdf.

[24] EPO, *The increased voluminosity of patent applications received by the EPO and its impact on the European*

examination workload burdens. Had the USPTO been publishing such studies, it could have benefited from peer review, suggestions for improved methods and information quality. Such practice would have also provided information to the public in order to assess the instant proposed rules.

3 THE USPTO FAILED TO COMPLY WITH EXECUTIVE ORDER 12,866.

3.1 The USPTO Failed to Rely on the Best Available Scientific, Technical, Economic and Other Information.

Section 1(b)(7) of the EO requires agencies to base their regulations on the best available technical information concerning the need for, and consequences of, the intended regulation. Based on the little information the USPTO has disclosed, it appears that the USPTO has failed to comply with this provision when attempting to forecast its workload and the effects of its proposed rules.

In Slide 9 of the Chicago Town Hall Slides, the USPTO stated the aggregate number of applications it received: "FY 05 plan 375,080 (5.5% above FY 04); FY 05 actual 384,228 (8.1% above FY04), 2.6% over plan." This means that the USPTO had projected in its FY 2005 plan an application growth of 5.5% from the prior fiscal year. No basis for that projection was identified and no explanation as to whether the underestimate of more than 9,000 applications was within the USPTO confidence interval or which application types (originals or continuations) have contributed relatively the most to this deviation. In its hypothetical scenarios in these slides, the USPTO must have changed its projection going forward and adopted the 8.1% annual growth value, apparently ***solely based on a single data point*** of the ***aggregate*** growth in applications it recorded in FY 2005 over FY 2004. The remarkable aspect of this newly adopted projection is that it apparently gutted any earlier projections, which the USPTO may have had (5.5%?) in its five-year strategic plan of the USPTO. But that long term Strategic Plan must have been used by the USPTO and Congress to plan and appropriate long term USPTO resource acquisition programs. By significantly changing its prediction upwards, does this mean that the USPTO admitted that it had not previously asked for adequate resources? In any event, it appears that the numerical application projections in the Strategic Plan changed and its current version published in February 2007 states:[26]

> "For the past decade, patent application filings have consistently risen, sometimes at rates of 10 percent over the previous year. In fact, this strategic plan anticipates that patent application filings will continue to rise at the rate of ***eight percent*** per year, through 2012. ***This growth is not a surprise, nor is it new***. The various proposals the USPTO has put forward in the past, and most recently with draft proposed rules changes, have stemmed from a recognition of the need to handle growth". (Emphasis supplied).

Apparently, the USPTO managers who presented the Chicago Town Hall slides and prepared the FY 2005 plans based on a 5.5% annual growth were not aware of the fact that a growth rate of

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Patent System. Report CA/73/05, (May 30, 2005) at http://ac.european-patent-office.org/strategy_debate/documentation/pdf/ec05073.pdf .

[25] E. Archontopoulos D. Guellec, N. Stevnsborg, B. Van Pottelsberghe de la Potterie and N. Van Zeebroeck, When small is beautiful: Measuring the evolution and consequences of the voluminosity of patent applications at the EPO, *Information Economics And Policy,* **19**(2), pp. 103-132, (June 2007).

[26] *United States Patent and Trademark Office 2007–2012 Strategic Plan*, (February 2007) at http://www.uspto.gov/web/offices/com/strat2007/ , at page 10.

8% ***is not a surprise, nor is it new***. Still another remarkable fact is that the current Strategic Plan assumes that the 8% growth will continue unchanged in the next five years. The USPTO provided no information on its models that predict such growth rate or any basis to the assumption that this aggregate application growth rate will remain unchanged for the next five years. Apparently, given that a fixed growth factor was assigned by the USPTO to the ***aggregate*** application number comprised of distinct application types having ***distinct*** historical growth rates, one must conclude that the USPTO did not base its prediction on the best data it has and established scientific methods of trend analysis. In such circumstances, these established methods predict the growth of each application type ***separately,*** based on its unique characteristic historical growth rate and then aggregate the results into the composite application count. The historical data fully broken by application type is known to the USPTO but it has not been disclosed to the public except to a private party in a FOIA request and is shown in Figure 1.

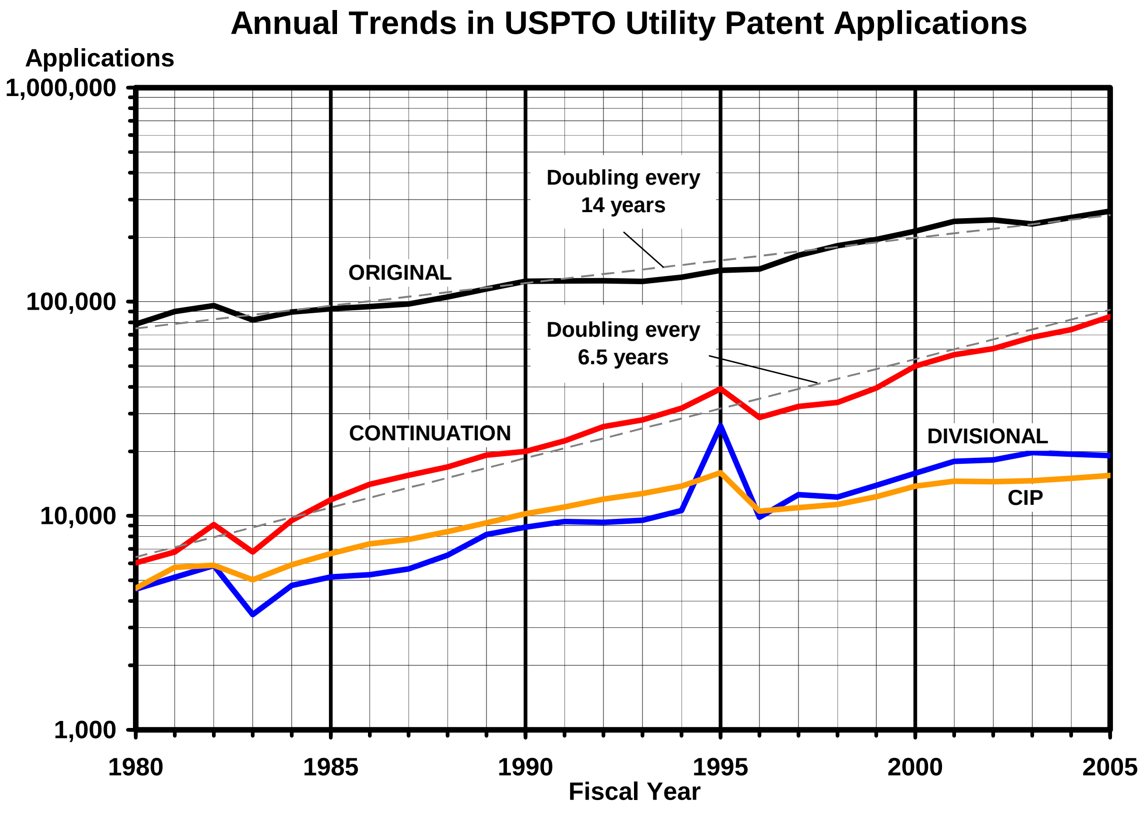

Figure 1. Trends for patent applications by application category. *Source*: Katznelson (2007), note 4, Figure 1.

As this figure shows, the two types of applications that dominate the aggregate application count are original and continuation applications, each growing exponentially on average. Original patent applications disclosing new inventions grow at a doubling rate of 14 years, a rate similar to that of the general growth of science[27]. In contrast, continuation applications grow more rapidly at a rate proportional to that of new product introductions, doubling every 6.5 years[28]. These growth trends have persisted over the last quarter of a century and thus would have been a reasonable baseline for predicting the growth of patent applications. When one combines multiple application components, each growing at a different exponential rate, one obtains an

[27] Katznelson (2007), note 4, Section 4.
[28] Katznelson (2007), note 4, Section 4 and Section 4.2.

aggregate application count that has a ***variable*** growth rate that nominally increases from year to year to approach that of the fastest growing component. In this case, based on empirical evidence, the fastest growing component doubles approximately every 6.5 years, corresponding to a growth rate of 11.3% per year. Thus, the USPTO assumption that the aggregate application number would keep growing at a ***constant*** rate for the next 5 years is in variance with the best data available to the USPTO.

Just when the ink dried on the 2007-2012 Strategic Plan, the USPTO appears to have changed yet again its projections for the annual increase in the aggregate application rate. In a June 6, 2007 presentation of John Love, Deputy Commissioner for Patent Examination Policy at the USPTO[29], Slide 12 stated the aggregate number of UPR applications as follows: "FY '06 419,760; Growth of 9.2% from '05; … FY '07 expected filings 445,923". Thus, the USPTO appears to have increased its FY 2006 growth estimate to 9.2% but expects a decline in the growth rate in FY 2007 to only 6.2%. It is unclear what underlying facts or models lead the USPTO to now project a lower application growth rate in FY 2007. Again, it is very likely from the recent record, that the USPTO is not using the best available scientific methods and information to project its load. It appears to use only single point trend analysis without considering the different historical growth rates for each component. In any event, its estimation and projection methods are not transparent, reproducible or reliable and it disclosed no confidence intervals to the influential numerical values it estimated or projected. Therefore, its application number information cannot be relied upon to assess the impact of its proposed rules.

The profound inability of the USPTO to project application loads and the consequent deficiencies of its planning are also evident in the USPTO's grossly overoptimistic Strategic Plan of 2003. Based on its projections at that time, the USPTO stated the following achievable goals:[30]

> "Achieve first Office action patent pendency of 14.7 months in fiscal year 2008.
> Achieve an interim patent pendency goal of 27 months by fiscal year 2008.
> Note: The USPTO will continue to work toward reducing pendency and pursue the long-term ***optimum*** goal of 18 months pendency beyond the five-year horizon of this strategic plan. Our best estimate is that it will take at least a decade to achieve the 18-month goal.
> ***Reduce*** total patent examiner hires through fiscal year 2008 by ***2,400*** compared to the 2003 Business Plan projection." (Emphasis supplied).

As we now know, the first two goals are far from being achieved, as FY 2006 Average First Office Action Pendency was 22.6 months and Average Total Pendency was 31.1 months. It is not clear why the USPTO regarded 18 months pendency as ***optimum***. Most remarkable, however, is the radical change during early 2003 in the USPTO's perceived need for examination resources. In a sweeping change of workload projections, the USPTO believed it could achieve all these production goals ***and*** avoid hiring the 2400 examiners that it projected it would need in its 2003 business plan. Unfortunately, the USPTO had not disclosed then its application filing models' details and projections methodology to permit the public and Congress to assess the basis for its radical change in workload projections. Evidently, it is very likely that the USPTO was not using the best available scientific methods and information to project its load then, as is the case more recently.

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[29] John Love, *Present and Future Perspectives of the USPTO*, presentation at the San Diego Intellectual Property Law Association, (June 6, 2007), at http://sdipla.org/resources/SanDiego071.ppt .

[30] USPTO, *The 21st Century Strategic Plan,* Updated: February 3, 2003, at page 11.

In fact, there is evidence that for ***over two decades***, the USPTO has consistently failed to predict, react to, or build-in enough margin for its incoming workload. The facts speak for themselves in Figure 2, in which the USPTO patent application *Loading Ratio* is presented by fiscal year. The Loading Ratio is defined as the number of new applications filed in a period divided by the application disposal capability number in the period (allowances plus abandonments). The processing of patent applications at the USPTO is best regarded as a queuing system having "servers" (examiners) who serve the queue (pending applications) with certain characteristic service time. The system is said to be a *stable* queuing system if the application arrival rate is equal to or lower than the system's service rate capability, taking into account the number of servers. The system is an *unstable* and overloaded queuing system when the loading ratio is greater than 1, i.e., the application arrival rate exceeds the application disposal rate capability. The plot in Figure 2 assumes that in every year, the actual disposal rate was the system disposal rate capability.

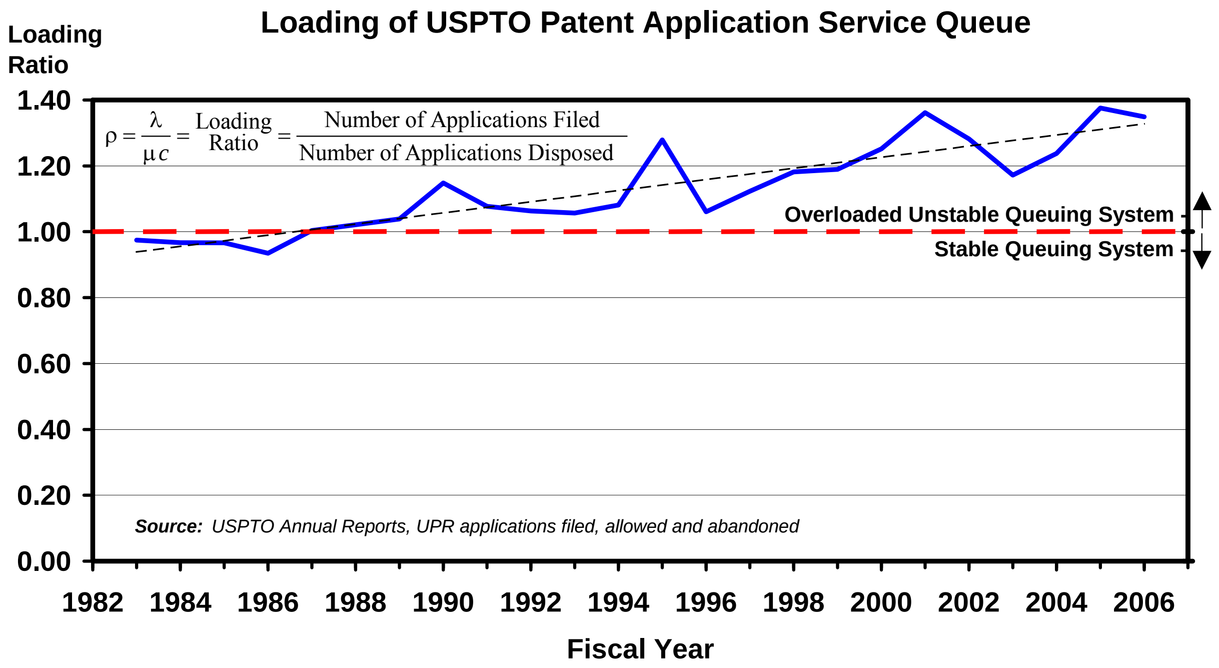
Loading of USPTO Patent Application Service Queue
Loading Ratio
$\rho = \frac{\lambda}{\mu c} = \text{Loading Ratio} = \frac{\text{Number of Applications Filed}}{\text{Number of Applications Disposed}}$
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Overloaded Unstable Queuing System
Stable Queuing System
Source: USPTO Annual Reports, UPR applications filed, allowed and abandoned
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
Fiscal Year

Figure 2. USPTO patent application queue instability over the last twenty years. The USPTO's application input rate exceeds its output rate by a factor that is gradually rising. The Loading Ratio is defined as the number of new applications filed in a period divided by the application disposal capability number in the period (allowances plus abandonments). *Source*: USPTO Annual Reports, see data in Appendix A**.**

There is no doubt that past redirection of USPTO user fees by Congress may have contributed somewhat to resource limitations that caused the overload instability seen in the figure. However, when reasonably reliable predictions of incoming application rates are made and margins are built-in, multiyear programs can be put in place to acquire the requisite USPTO resources to serve the growing queue of incoming applications. If such ***reliable and correct*** long-term predictions were presented to Congress, with USPTO insistence, Congress could have appropriated more resources to ensure the success of these programs. Unfortunately, as Figure 2 shows, the USPTO consistently failed in this role over the last two decades.

3.1.1 The trouble with pendency metrics

This aforementioned USPTO failure is likely due to its focus on methods and metrics that do not utilize best available scientific, technical and economic tools to measure, predict and control its ability to serve the workload. Largely, USPTO's failure to recover from the instability of the last 20 years is due to its focus on average pendency metrics rather than the fundamental system stability metric shown in Figure 2. Pendency probability distributions are skewed with significant probability mass having pendencies longer than the average pendency. Because the USPTO employee reward system is in part tied to average pendency goals, average pendencies can be (and likely have been) manipulated by USPTO management and its examination corps ***without*** altering significantly the Loading Ratio. Manipulation for short-term gains by temporarily focusing examination resources on "easier new" cases can result in later surges of longer pendencies due to the "older and harder" cases left behind.

Pendency is a composite ***lagging*** indicator comprised of backlog and queuing time, applicant's response time and examination time, which depends on the complexity of inventions and the scope of the relevant prior art. Therefore, it is a rather poor and indirect metric of USPTO workload stability. It is possible to have long average pendency in a system that is stable (Loading Ratio ≤ 1), with no temporal increases in pendency. It is also possible that a shorter pendency can be experienced in an unstable system (Loading Ratio >1) but due to the overload instability, it is accompanied by a subsequent increase in pendency. An example for the latter case is the period between 1989 to 1991, when the USPTO had very low average pendencies, which it characterized as "optimal"[31]. Any naïve observer of the system using the pendency metric alone probably thought that the USPTO was in great shape and needed no more resources. USPTO managers might have even been rewarded for their success in reducing pendency. However, the fact is that in 1990, the USPTO disposed of ***fewer*** applications than it did in the prior year (see Appendix A). As Figure 2 reveals, the application Loading Ratio during these years significantly exceeded one, indicating instability and a trend of average pendency increase. Indeed, as Slide 50 of the Chicago Town Hall presentation shows, runaway average pendency increases ensued after 1991. Clearly, USPTO pendency reduction goals do not necessarily convey the relevant story. The USPTO's exclusive focus on pendency has historically masked the fact that it has remained an unstable queuing system for years with runaway pendencies. For this reason, pendency as a sole metric can be, and has been, deceptively damaging to the USPTO's ability to plead for, and secure, required resources from Congress and the public.

A simple analogy can be useful for appreciating why average pendency is often not a relevant metric. In an approximate analogy, average pendency could be thought of as the *speed* of a car, whereas the Loading Ratio is analogous to the gas pedal *throttle position*. Application Loading Ratios exceeding one correspond to car acceleration, whereas deceleration corresponds to ratios less than one. Upon acceleration (deceleration), the car speed increases (decreases), just as pendency would under a Loading Ratio that is more (less) than one. Every driver attempting to control the motion of a car is keenly aware of its best means of control - the gas pedal, ***regardless*** of the speed of the car. When a driver notices that the speed gauge indicates an alarming 160 MPH, at no time does he/she set a goal to achieve a speed of 140 MPH. Rather, the immediate goal and instant reaction is to ***cease acceleration*** because without an affirmative action to cease acceleration (and not just reduce it), the 140 MPH goal is unattainable. The USPTO appears to

[31] See the historic pendency chart in Slide 50 of the Chicago Town Hall slides, showing average pendencies in the order of 18 months during 1989-1991. Note, however, the subsequent increase in pendency due to the system's instability.

seek certain illusory "speed" goals that may never be attainable because it has not set a goal to fully cease the "acceleration". Nowhere in the USPTO's discourse about pendency and workload, could I find an articulation of measurable goals of stopping the "acceleration", i.e., arriving at a state wherein the number of application disposals keeps up with the number of new applications filed, ***regardless*** of what average pendency the system may stabilize at.

Most remarkable is the fact that USPTO management appears to build long term failure into its plans. The Chicago Town Hall presentation shows that the USPTO has recently charted a five-year course that by the end of which, under its most optimistic projections and goals, will ***still not achieve stability***. Under the most optimistic production scenarios shown in Slide 29, the USPTO plans to achieve 542,000 production units capability in FY 2010. However, based on FY 2005 incoming application count of 384,228 and USPTO's long-term application growth projection of 8.1% per year, the incoming application count in FY 2010 will rise to 567,176, still exceeding its best scenario projected disposal production rate capability of 542,000. In other words, the USPTO ***by its own design*** does not intend to cease "accelerating" even by 2010!

To achieve stability, the USPTO must not only articulate that stability is one of its goals, but it must be able to avoid underestimating its long-term application load. To be sure, one does not expect the USPTO to employ prophets. Rather, a projection based on the *best information available* and if need be, added margin for error in order to assure stability, is what can reasonably be expected. Because achieving Loading Ratios that do not exceed a value of one is not an articulated management performance criteria at the USPTO, no consequential incentives appear to exist for predicting ***correctly*** or leaving enough margins for the incoming application load[32]. Consequences for failing to do so do not appear to exist either.

The USPTO's assertion that a pendency of 18 months is optimal appears arbitrary. It is certainly desirable to have a patent examination system with such short pendencies. However, the USPTO provided no cost-benefit analysis of average pendency impacts to show that any particular average pendency period is optimal. Nor did it provide any cost criteria to assess the benefit to the public or patentees from shortening average pendency period by a given number of months. For that matter, it provided no assessment of the cost of letting pendency remain high if any one, or both, of the proposed rules are ***not*** adopted.

Compared to the average pendency delays in the USPTO, examination pendency delays in other patent offices were incrementally longer by as much as 2 years in the EPO and up to 6 months longer in the Japanese Patent Office ("JPO")[33]. Applicants having U.S. application priority may delay the application for the same invention in foreign countries while preserving their priority date. Many elect to use the full permissible delay period of 2.5 years from their U.S. priority application date prior to filing in the EPO or JPO[34]. Moreover, patent issue delays in these other patent offices are even longer given that applications do not enter an examination queue upon filing but only upon *a request for examination*. The total relative delays comprise those discussed in Section 3.3.1 for requesting examination, the cumulative delays in filing applications, requesting examination and examination pendency. These total delays resulted in these foreign offices engaging in prosecution exchange with the patentee on the same inventions some 5 to 8 years later than the USPTO. While these lengthy delays are not advocated here for the USPTO to adopt or to slide into, they are merely presented here as a context for the cost-benefit analysis that the USPTO failed to provide for using only pendency metrics to assess the impact of the proposed rules.

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[32] A sound policy is to build-in the margin required for unexpected surges so that during periods of lower incoming application traffic, examiners can spend some time improving their knowledge of industries and fields of art by attending technology conferences and seminars.

[33] Trilateral Patent Offices, *Trilateral Statistical Report 2005 Edition*, Munich, Germany, (October 2006). at http://www.trilateral.net/tsr . The table "Statistics on the Procedures" in the web annex contains the entries for 'pendency examination in months' for the three patent offices, at http://www.trilateral.net/tsr/tsr_2005/web_annex/web_annex.xls ("Procedures" sheet).

[34] Under Chapter I-Article 22 or Chapter II-Article 39(1) of the Patent Cooperation Treaty ("PCT"), applicants using the PCT path can enter into the national application phase in the JPO and the EPO after a delay of 30 months or 31 months respectively from their U.S. priority date. *See* WIPO, *Time Limits for Entering National/Regional Phase under PCT Chapters I and II*, table at http://www.wipo.int/pct/en/texts/pdf/time_limits.pdf.

In presenting the pendency scenarios in the Chicago Town Hall slides under the assumption that its proposed regulations are adopted, the USPTO used the pendency metric as its ***sole*** value indicator. Apart from the deficiencies in the quality and completeness of the data in these slides (described in Section 2.1), the USPTO relied solely on pendency measures and not Loading Ratios while inadequately analyzing the effects of its proposed rules. For the reasons detailed above, by such single item reliance, the USPTO failed to meet its obligations under Section 1(b)(7) of the EO because it failed to base its regulations on the *best available technical information* concerning the *need* for, and *consequences* of, the intended regulation.

3.1.2 The Proposed Rules Must Be Analyzed Using the Differing Examination Workload Statistics of Continuation Applications.

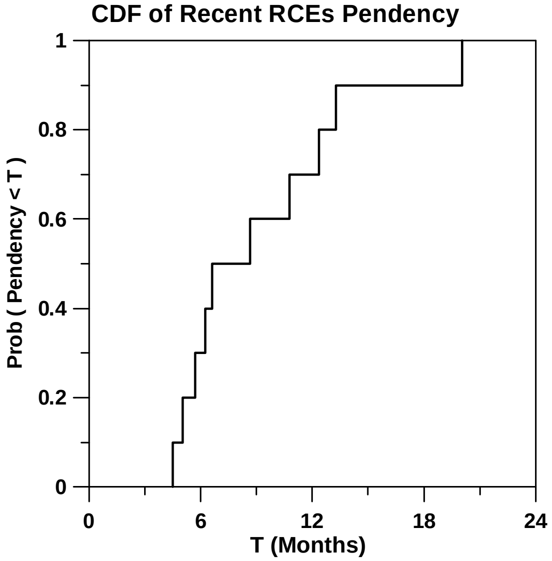

Figure 3. Pendency distribution of patents issued from continuation applications. The sample average pendency was 9.3 months**.** *Source*: USPTO PAIR web site (note 35).

Several parties commenting on the Continuations Rules in this proceeding have correctly indicated that the amount of USPTO time spent to dispose of a continuation application is significantly shorter than that of an original application. This is because in the case of a continuation, the examiner has already searched, discovered and analyzed much of the relevant prior art. The amount of examiner time spent on ***a second*** continuation is expected to be even shorter still. There is no evidence that in analyzing its Continuations Rules, the USPTO actually incorporated these reduced workload statistics. In fact, there is no evidence that the USPTO even assembles such statistics, which it can obtain from its PALM database system.

To appreciate the potential differences, I randomly sampled the USPTO Public PAIR System[35] and examined only 10 patents that issued on June 5 from a continuation (an RCE, in particular). The length of time between the RCE filing date and the patent issue date was recorded and plotted in a Cumulative Distribution Function ("CDF") shown in Figure 3.

In the time I spent, it was difficult to find patents that issued from a ***second*** continuation. Therefore, the sample contained only patents issued after a single RCE, the sample average pendency of which was 9.3 months. No doubt, a study of this type must be made with a much larger sample, must distinguish between various types of continuations and must have many more controls. The USPTO should be compelled to conduct such a study and publish its results prior to adopting any related regulations. In any event, the sample average I obtained is substantially shorter than the latest USPTO average pendency of 31.1 months. These results are expected. Even if other continuations generally have longer pendencies than 9.3 months, their pendency is expected to be significantly shorter than the total average pendency of 31 months.

Given these facts, the USPTO's assertion that the Continuations Rule, which eliminates second continuations, would result in shorter pendencies defies any logic and common sense analysis. ***By eliminating from the application pool the applications that have the shortest pendencies, one does not reduce the average pendency over the pool but rather, one increases it.*** Based on the same principles, one can see that the positive production gains the USPTO expects as shown Table 3 in part due to limiting continuations, is also illusory. According to the USPTO, the gain in production is not due to an increase in the examiner corps (which is already assumed in the baseline). Rather, the USPTO projects that the same examiners would be able to dispose of more applications. This means that the USPTO expects that on average, applications will take less time to process. Again, for the Continuations rule, this defies any logic because the applications that take the least amount of time are continuation applications. Having them in the pool results in higher average unit production rate for the same workforce. Under the rule, however, when the relative number of continuations in the application pool declines, an average unit takes ***longer*** to process and the examination corps' unit production rate must therefore ***decline*** and not increase, contrary to USPTO predictions in Slide 29. The USPTO must be compelled to show its analysis that produces results contrary to simple logic. Clearly, in this regard, the USPTO also failed to base its regulations on the *best available technical information* concerning the *consequences* of the intended regulation, in violation of Section 1(b)(7) of the EO.

3.2 USPTO's proposed rules were accompanied by no regulatory analysis of social benefits and costs

Section 1(b)(6) of the EO requires that:

> "Each agency ***shall*** assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only upon a ***reasoned determination*** that the benefits of the intended regulation justify its costs". (Emphasis supplied)

The USPTO's proposed rules were accompanied by no analysis of social benefits and costs – only the assertion that they would simultaneously reduce USPTO backlog and benefit innovators. The benefits and the costs were not presented by the USPTO and it certainly did not provide a ***reasoned determination*** that even the qualitative benefits of the intended regulation justify its qualitative costs.

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[35] USPTO, online at http://portal.uspto.gov/external/portal/pair.

In proposing to limit the number of continuations that applicants can file based on an original disclosure, the USPTO has not disclosed any analysis of the social benefits and costs that such limitation would impart. There appears to be no USPTO consideration of the fundamental economic reasons for the growing use of continuations by applicants. As Figure 1 shows, there is an underlying acceleration factor propelling continuation filing at a growth rate that exceeds that of original applications. As shown elsewhere[36], this growth trend is tightly coupled to the rate at which new products are introduced and it is likely a result of the shortening product lifecycle over the years[37]. By not even acknowledging the fact that patent continuations seek to protect new products with new claims that have not been submitted or allowed in the prior original application, the USPTO ignores a fundamental economic phenomenon, which it does not analyze. The USPTO failed to seriously consider the overwhelming number of comments it received in this proceeding stating that there are many reasons and instances wherein applicants cannot submit all claims in original applications and that in many cases it takes several iterations over a few years to converge on such claims. The USPTO has apparently assigned no value to such assertions although it could have looked into its database to sample the exact nature of the claims submitted in continuations and how they differ from those in the original applications.

The USPTO misleads itself and others by characterizing continuations as “Rework” that could have been submitted in the original application. The Katznelson (2007) paper is replete with explanations to the contrary. Moreover, the proposed rules upset balances that exist between applicants' various obligations under the law. 35 USC §112 and §120 of the Patent Act put an applicant to an obligation to file an application as early as possible, as soon as the technical details of "the manner and process of making and using" the invention can be assembled on paper. In most cases, the deadline for filing an initial application is unknowable, because it is established by the activities of others in the field, often secret activities. Thus the pressure to file when the application is as complete as required by law - and no more so - is intense. The Patent Act then gives an opportunity for "post filing clean up", amendments, additions and midcourse corrections. Applicants therefore continue and complete a number of the activities required for final issue of a patent ***after*** that initial filing date. The procedural mechanisms for doing so - amendments, continuations, and adding new claims with the filing of a fee - are also provided by statute.[38] The urgency of one deadline only makes sense if the flexibility exists under the other. The proposed Continuations and Claim Limits rules upset the balances struck by the various parts of the statute.

Apart from having a role as means of “post filing clean up” that may take several continuations, the indispensable role of continuations in late claiming that reduces technology investors’ risks is apparently misunderstood at the USPTO. Appendix B details my own experience in which my company was saved from a shutdown that would have resulted in having to let go of all 40 employees and a total loss to our investors. Instead, the company was saved by redirecting its technology to a new industry segment with products that employ the disclosed (but previously unclaimed) technology in a manner that could not have been anticipated at the time the original patent application was filed. Without being able to protect these products under patents that were obtained from the 4th, 5th, 6th and 7th continuation application, we would not have been able to secure our investor’s support for the business redirection required to sustain the company.

[36] Katznelson (2007), note 4, Section 4 and Section 4.2.
[37] Katznelson (2007), note 4, See Figure 4 and accompanying discussion.
[38] 35 USC §41(a)(2), §120, §131, §132, §134.

By not attempting to quantify or measure the social benefits of permitting this economic trend and this statutory balance to continue, and by not similarly evaluating the social benefits (if any) of limiting continuation applications, the USPTO failed to meet the requirements of Section 1(b)(6) of the EO.

A similar deficiency in USPTO's rulemaking process is found in its Limits on Claims Rule, which proposed to limit the number of claims in an application. Here too, the USPTO totally ignored any economic considerations that compel applicants to file a growing number of multiple claims in an application.

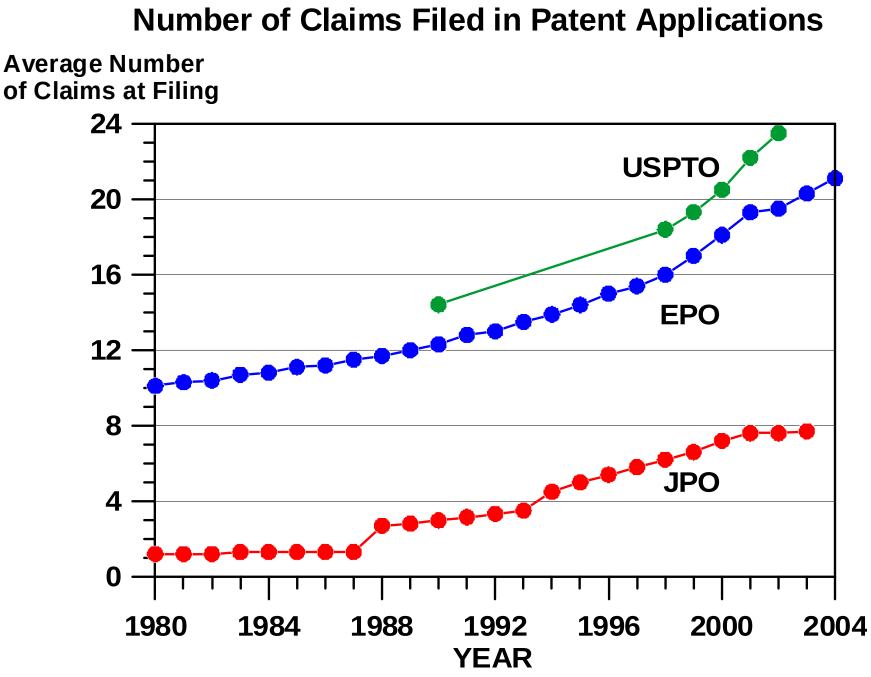

Figure 4. The average number of claims filed in patent applications by filing year at the USPTO, EPO and JPO. *Sources*: USPTO data for 1998-2002 was taken from its IG report[39] and the 1990 data is at slide 59 of the USPTO Chicago Town Hall presentation (note 20). All EPO data and the JPO data for 1995-2003 were reported in an EPO report (note 24); Data for additional years in the JPO were obtained from the Tokyo Institute of Intellectual Property[40].

The average number of claims in applications filed at the USPTO, EPO and the JPO are shown in Figure 4. A clear trend of an ***increase*** in the number of claims at filing is seen. National patent offices that had claim limits have recognized the need to remove them. In 1988 the JPO allowed applicants to obtain patents with more than one claim[41]. As seen in the figure, historically, the USPTO has had the highest average number of claims filed in patent applications. Without evaluating the causes and economic values associated with this claim count increase trends, the USPTO cannot assess the costs of its draconian measure intended to limit the number of claims in some instances and to impose severe burdens on others who wish to exceed the arbitrary 10 claim limit. There is evidence that the reasons for the historic increases in the number of claims in patent applications is related to the fact that over time, patents are issued with claims of diminishing breadth[42] and that over time adequate protection of patented products require more claims. By filing more claims in an application, patentees seek to appropriate equivalent returns from their inventions.

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[39] U.S. Department of Commerce, Inspector General, *USPTO Should Reassess How Examiner Goals, Performance Appraisal Plans, and The Award System Stimulate and Reward Examiner Production*. Final Inspection Report No. IPE - 15722, (September 2004), at Figure 12.

[40] A. Goto and K. Motohashi, Construction of Japanese Patent Database for Research on Japanese patenting activities, *Institute of Intellectual Property*, Tokyo, Japan (2006) at http://www.iip.or.jp/e/patentdb/paper.pdf. (The grand average was estimated by using the technology sector data of Figure 5 weighted by the number of applications for each technology sector shown in Figure 2).

[41] Effective January 1, 1988, Article 36,¶5 and Article 37 of the Japanese Patent Act provided that multiple claims may be present in a single patent application subject to the unity of invention requirement. Prior to this change, multiple claims were allowed in rare exceptions that appeared mostly in chemical and pharmaceutical patents.

The USPTO also failed to present any social benefits for limiting the number of claims. Except to state that the USPTO may benefit from a reduction in administrative burden, no benefit to the public as a whole was articulated or reasoned.

The USPTO also failed to consider the US national competitiveness interests that would be affected by imposing limitations on claims that other national patent offices do not. If US patents are issued with patents that have fewer claims, US intellectual property rights will be weakened in comparison to foreign patent rights, resulting in harm to US international competitiveness. By not attempting to quantify or measure the social benefits of permitting applicants to submit as many claims as they care to pay for, and by not similarly evaluating the social benefits (if any) of limiting the number of claims in an application, the USPTO failed to meet the requirements of Section 1(b)(6) of the EO.

3.3 ·The USPTO Failed To Consider Known Regulatory And Nonregulatory Alternatives

The regulatory philosophy stated in Section 1(a) of the EO provides in pertinent part that "[i]n deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating". A number of available alternatives were known to USPTO but not considered. Only two are addressed below.

3.3.1 Examination-On-Request.

Examination of claims submitted in an application in the USPTO is automatic and every non-provisional application enters the examination queue. In contrast, it has been a long-standing practice in foreign patent offices to use a system in which a specific request for examination must be made for a pending application. Such a request may be filed no later than 2 years (or 31 months via the PCT) in the EPO[43] and up to 7 years in the JPO[44] from the original filing date in order to prevent abandonment. In a sample reported by Jensen et al., the median times to request examination in the EPO and the JPO were 2.5 years and 5.75 years respectively[45].

Unlike U.S. patent applications of which 100% are examined, as a result of the permitted delay for requesting examination, not all patent applications in foreign patent offices are followed-up by requests for examination. Thus, a fraction of such applications does not even reach the examination stage due to obsolescence or lack of utility to the patentee. The fractions that reach the examination stage in the trilateral offices are shown in **Figure 5**. Claim obsolescence results in a greater fraction of application abandonment in patent offices that permit longer delays for examination requests. As seen in the figure, 85% - 90% of applications filed at the EPO enter examination (after a median of 2.5 years) and only 50% - 60% enter examination at the JPO (after a median of 5.75 years from the application date). Hence, at the outset, the EPO is ultimately spared from having to examine up to 15% of the pending applications. More spectacularly, some 40% of the patent applications filed at the JPO are never examined.

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[42] Katznelson (2007), note 4, See Section 4.3 "The Patent Scope Erosion".

[43] Article 94(3) EPC provides that an application is deemed withdrawn if examination request is not filed within 6 months of the publication of the search report in the EP Bulletin. The search report is made public by the EPO typically with the publication of the application, which takes place eighteen months after the priority date of the patent application.

[44] Article 48-3 of the Japanese Patent Act was amended as of October 1, 2001, shortening the deadline for requests for examination from 7 years to 3 years after the filing date.

[45] P.H. Jensen, A. Palangkaraya and E. Webster, Disharmony In International Patent Office Decisions, *Federal Circuit Bar Journal* **15**(4), pp. 679-704, (2006) (see footnote 43 at page 692).

The important feature of this system is that without even any refund of application fees, such cuts in examination workload are made voluntarily by applicants and not by draconian measures of limiting applicants' opportunity to obtain patent claims. This also means that because the USPTO examines every application, it is faced with increasing burdens of examining some claims that are unworthy of having been examined. Importantly, these patents are obsolete when issued and are unlikely to collect any maintenance fees for the USPTO.

Instead of its proposed rules, the USPTO could have suggested a transition to examination-by-request as means of providing the much-needed relief in the workload and backlog. As an example, under this examination regime, there will be a set time-period (say 3-5 years) after a patent application is filed for requesting claim examination at the USPTO. Any party may trigger examination after publication of the application, and not just the request of the applicant. This will prevent a patentee from holding off prosecution of a patent that others find problematic and in need of early patentability resolution. Applications for which no request is filed within the set period will be deemed abandoned and will never be examined. Based on the EPO example in **Figure 5**, one can expect that some 15% of applications will not be examined because their owners would not find in such applications ***even a single claim*** worth obtaining. However, even applications that ultimately become subject to examination request contain ***some*** claims that are obsolete and therefore get cancelled upon a submission for examination request.

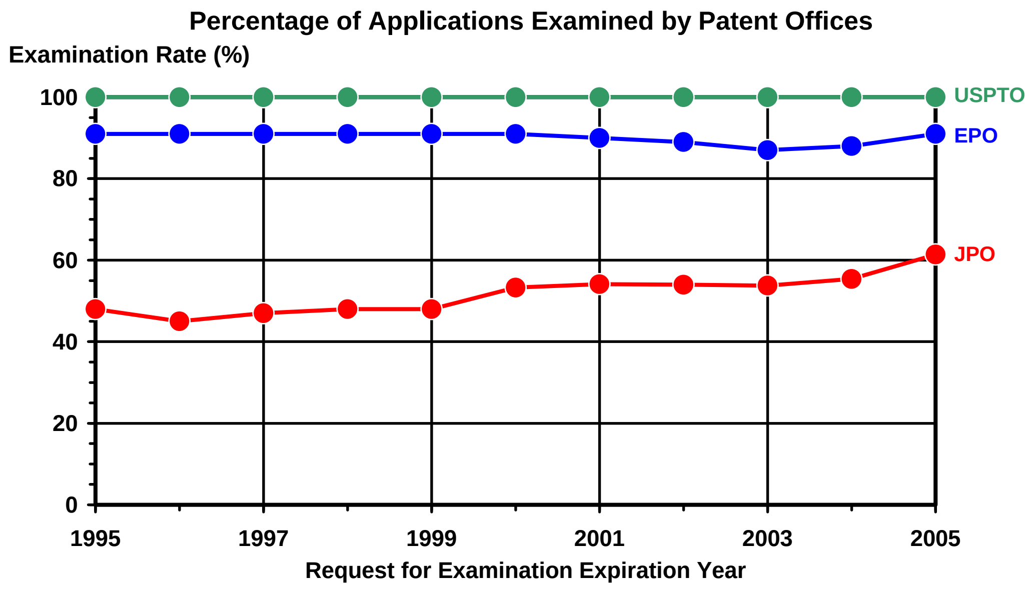
Percentage of Applications Examined by Patent Offices
Examination Rate (%)
100
80
60
40
20
0
USPTO
EPO
JPO
1995
1997
1999
2001
2003
2005
Request for Examination Expiration Year

Figure 5. Patent examination rate by reporting year. Examination rate is the proportion of those applications, for which the period to file a request for examination expired in the reporting year, that resulted in a request for examination up to and including the reporting year. *Source*: Trilateral Patent Offices, note 33.

Therefore the fraction of ***claims*** (not applications) that would not have to be examined is expected to be significantly higher than 15% and may well reach 25%. This percentage in workload relief dwarfs the 4.7% that the USPTO was hoping to achieve in its instant ill-advised proposed rules. Of great importance is the suitability of the Examination-On-Request system for the ***existing backlog*** of applications at the USPTO. A notice to all applicants having pending applications can be sent informing them of the suspension of automatic examination and informing them of their respective deadlines for submitting requests for examination. In this manner, the USPTO will experience an ***immediate*** large relief in workload, permitting it to work through the long pendency backlog.

It is important to recognize the self-regulating aspect of the Examination-On-Request regime going forward. This is because the same product lifecycle reduction factor that causes increased demand for new claims in continuations, ***is also the very factor*** that causes increased claim obsolescence, decreasing the number of claims for which examination requests will be made. It is also the best method to eliminate examination investments in patents that are unlikely to produce any maintenance revenue for the USPTO. Therefore, the Examination-On-Request system is ultimately the fairest solution to the USPTO workload problem because it cuts down substantially on the number of claims that must be examined, without denying patentees' right to obtain claims for any invention, while increasing USPTO profitability. It is hard to envision how, over the long term, the USPTO would be able to address the growing examination burden associated with the shortening product lifecycle without also taking advantage of the related claim obsolescence phenomenon. These two attributes are inextricably linked and any efficient patent examination regime should rely on claim obsolescence at the front-end.

The USPTO has known about, and has considered, an Examination-On-Request system at least once, in 1998 when it issued an advance notice of rulemaking[46] in which Topic 11 contained such a proposal. In response, it received comments from the public[47]. It characterized the comments as including support and opposition in roughly equal measure to the proposed extended suspension of action procedure. Without any analysis or explanation, the USPTO declined to adopt its proposed rule and concluded by stating: "Response: This notice does not propose changing § 1.103 to provide for extended suspension of action." [48] It is interesting to note that receiving comments from the public in which half of the parties objected, was apparently sufficient for the USPTO in that proceeding to abandon its proposed rule. Yet, in the instant Limits on Claims and Continuations rules proceeding, the fact that an overwhelming majority of comments received from the public objected to the rules is somehow irrelevant to the USPTO.

It should be further noted that many of the objections to USPTO's Examination-On-Request proposal back in 1998 were predicated on its feature requiring publication of the application, when applications were still secret. However, today this issue is moot for the most part due to the publication provisions of the American Inventors Protection Act of 1999[49] ("AIPA"). Thus, these old objections are no longer relevant. Moreover, in separating the patent fees into a filing fee and an examination fee, Congress has already acted in the AIPA to enable the USPTO to adopt an Examination-On-Request system.

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[46] See **63** *Fed.Reg*. 53497 (October 5, 1998), Proposed Rules, Topic11, "Providing no cause suspension of action".
[47] See Comments on Advance Notice of Proposed Rulemaking (December 17, 1998) at http://www.uspto.gov/web/offices/pac/dapp/opla/comments/anpr/
[48] Changes To Implement the Patent Business Goals, Notice of Proposed Rulemaking" **64** *Fed Reg*. 53772-53845, at 53775.
[49] Pub. L. 106-113 (November 29, 1999), §1000(a)(9), 113 Stat. 1501A-561 to –566, codified at 35 U.S.C. §122 (2000).

3.3.2 Financial Incentives For Applications With Reduced Number of Claims.

The USPTO has recently obtained information on the effect of claim fee changes on the average number of claims filed in an application. Effective December 2004, the USPTO obtained the authority to impose higher fees on applicants based on the number of claims they file. The fee for claims in excess of 20 was raised from $18 to $50, and for independent claims in excess of 3 was raised from $86 to $200.[50] In response, applicants have reduced the average number of claims they filed and the USPTO must have recorded a decline in the average number of claims submitted by applicant. Independent research data on this US effect was recently published by researchers at the EPO as shown in Figure 6. Two observations are worthy of note:

1) Applicant's behavior appears to indicate some permanence to the change, indicating that the relative decrement step in the number of claims can be expected to remain in the long term.

2) A reduction of approximately 20% in the average number of claims appears to have taken place, although foreign applicants were slower to absorb the price increase information.

A detailed study that can only be done by the USPTO can reveal the price elasticity associated by this 20% decrease in claim count. However, given that by cutting down, applicants probably saved several hundred dollars on average, one can envision structuring an incentive to applicants that credits them by several hundred dollars in exchange for further reducing their total claims. While another 20% reduction is unlikely, perhaps a 10% reduction may be feasible. Another alternative is for the USPTO to ask Congress to authorize yet another graduated fee increase, with slope breakpoints at 10 and 15 claims and at two independent claims.

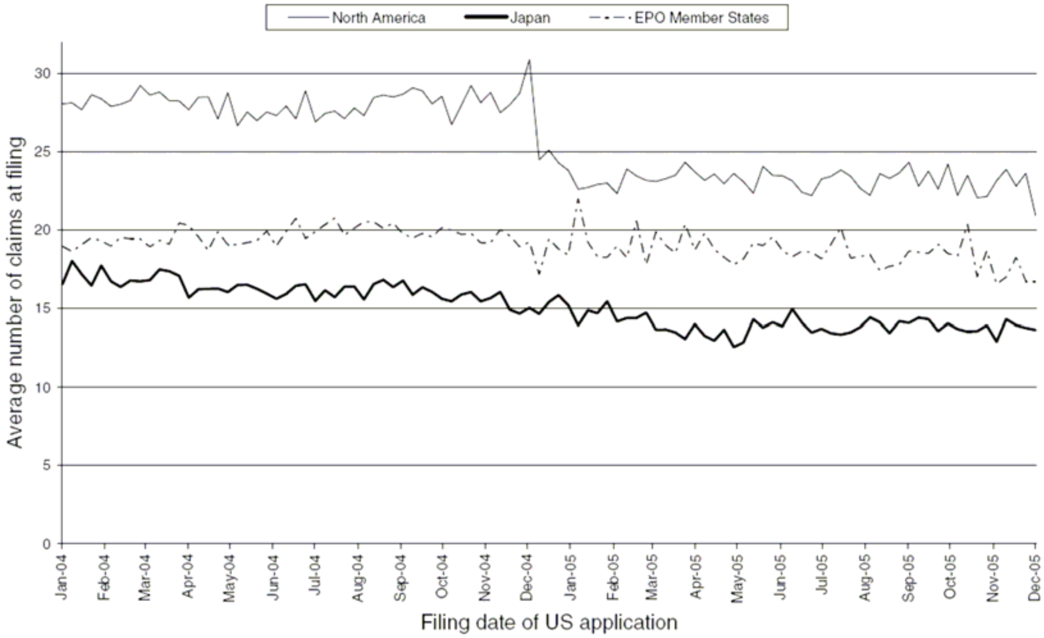
North America
Japan
EPO Member States
Average number of claims at filing
30
25
20
15
10
5
0
Jan-04
Feb-04
Mar-04
Apr-04
May-04
Jun-04
Jul-04
Aug-04
Sep-04
Oct-04
Nov-04
Dec-04
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
Oct-05
Nov-05
Dec-05
Filing date of US application

Figure 6. A decline in the average number of claims filed in US patent applications after an increase in claim fees in December 2004. USPTO applicants from North America appeared more informed and responded quickly while applicants from Europe and Japan responded more slowly. *Source*: Archontopoulos et al, note 25, Courtesy Elsevier B.V.

[50] See changes to 37 C.F.R. § 1.17 from that in 2004.

The important point is that a 10% workload reduction may be a realistic goal; a gain that is twice that of the best projected gains the USPTO was contemplating in the instant rulemaking proceeding. This alternative and the Examination-On-Request alternative were known to the USPTO and should have been considered by the USPTO. By failing to do so, the USPTO did not comply with Section 1(a) of the EO.

4 CONCLUSION

The USPTO has proposed to terminate its most profitable products while dismissing the opportunity to cease working on its least profitable examination investment. Because of the procedural defects outlined above, I believe that OMB should return these proposed rules to the USPTO, and designate them as economically "Significant Regulatory Action". A Regulatory Impact Analysis fully compliant with OMB Circular A-4 should be prepared by USPTO and published for public comment. All influential information used to support this analysis should adhere to the principles of OMB's Information Quality Guidelines. I believe that when completed, the USPTO would be able to propose an informed set of reasonably available regulatory and nonregulatory alternatives such as the ones discussed above and identify the one that maximizes net benefits to society.

Sincerely,

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Mobile: (858) 395-1440
rkatznelson@roadrunner.com

APPENDIX A. Application Loading at the USPTO

Item	A	B	C	D	E
Fiscal Year	Total Applications (excluding design patent applications)	Applications Allowed	Applications Abandoned	Application Disposals D = B + C	System Loading E = A/D
1983	97,448	64,376	35,555	99,931	0.98
1984	109,539	69,987	43,313	113,300	0.97
1985	116,427	75,405	45,083	120,488	0.97
1986	121,611	80,921	49,151	130,072	0.93
1987	126,407	79,755	46,190	125,945	1.00
1988	137,069	87,870	46,351	134,221	1.02
1989	151,331	98,472	47,218	145,690	1.04
1990	163,561	96,672	45,750	142,422	1.15
1991	167,715	102,014	53,703	155,717	1.08
1992	172,539	103,093	59,199	162,292	1.06
1993	174,553	104,351	60,763	165,114	1.06
1994	186,123	107,221	64,932	172,153	1.08
1995	221,304	106,566	66,460	173,026	1.28
1996	191,016	121,694	58,358	180,052	1.06
1997	220,773	135,240	61,367	196,607	1.12
1998	240,090	143,045	60,102	203,147	1.18
1999	261,013	155,380	64,062	219,442	1.19
2000	293,244	166,200	68,056	234,256	1.25
2001	326,081	166,868	72,566	239,434	1.36
2002	333,688	171,814	88,417	260,231	1.28
2003	333,452	188,283	96,176	284,459	1.17
2004	355,527	179,349	107,824	287,173	1.24
2005	384,228	164,093	115,232	279,325	1.38
2006	417,819	165,872	143,787	309,659	1.35

Source: USPTO, Annual Reports, at http://www.uspto.gov/web/offices/com/annual/index.html

APPENDIX B. Broadband Innovations' use of patent continuations at the USPTO was essential to its survival

The following is an account of my experience regarding the role of intellectual property in technology development, start-up marketing and in attracting investments for my San-Diego California based corporation (Broadband Innovations, Inc., "BI" or the "Company"). Investments for the Company were obtained from venture capital firms and from strategic industry partners including Ameritech (now SBC), Motorola and Scientific-Atlanta. Since its founding in 1990 these investments were made over the years in multiple rounds wherein our growing and ***changing*** patent claims portfolio played a vital role in securing such investments and in our ability to attract and retain excellent employees. As a result, we have reached an employee count of 45. Some of the patented technologies and products developed by our company are now exploited by Motorola. Inc., that retained most of our employees after its acquisition of the Company in December 2005[51].

Broadband Innovations, Inc. ("BI") received its name in 1999 after a corporate name change from Multichannel Communication Sciences, Inc. ("MCSI"). I founded the Company in 1990 in order to develop new multichannel Radio Frequency ("RF") technologies for use in the Cable Television industry and in order to sell products based on such proprietary technologies.

The first multiyear project on which work began was the reduction to practice of a Broadband Descrambling technology ("BD"). The system restores for cable subscribers many television benefits that are restricted by conventional set-top based scrambling systems, including the use of cable-ready TV set for picture-in-picture, the ability to watch any channel on television while recording another channel on a VCR and the use of original remote controls. The BD system, when installed by the cable television operator outside the subscriber's residence, uses a novel technology that can descramble over 50 television channels *simultaneously*, while passing an unlimited number of clear channels. Using the BD system, viewers are free to experience cable programming on every television in the home without a set-top.

In a parallel development, a second project for which simulation work and patenting activity took place was a Distortion Canceling Multicarrier System, which we called the *Fidler*. A utility patent application for the latter was filed in 1990 and issued in 1992. Work on the BD system continued diligently throughout this period, in an effort to reduce it to practice and to build a laboratory demonstration. Because a confidential presentation to CableLabs was set on a date in January 1992, there was only a given amount of time to complete a patent application and file it prior to the presentation. Thus, most of the remaining time was spent on writing a detailed disclosure rather than spending much time crafting more claims, knowing that later additional claims in an amendment could be filed. In January of 1992, the first patent application disclosing the BD system was filed. Given our limited resources, had we not been able to rely on such later opportunity to add claims during pendency of the application, we would have had to spend more time on crafting claims and less on the disclosure. In that event, the disclosed specification would have likely been less informative, not as enabling, and potentially lacking adequate support under §112 to properly claim all other aspects and features of the invention.

Because of our inability to secure more resources and continue to develop the *Fidler*, no further system development took place and the *Fidler* patent issued having the scope of claims that were in its initial prosecution. In contrast, as work continued on the BD system with only a few engineers, we persisted in efforts to raise capital to develop requisite components and subsystems for the full operation of the BD system. For this purpose, we demonstrated BD engineering prototypes with partial functionality at the 1993 National Cable Telecommunications Association ("NCTA") trade show, where a first public disclosure of the BD system was made in a technical paper. Subsequently, continuation applications for the BD were filed and granted as patents.

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[51] See http://web.archive.org/web/20060117060539/www.motorola.com/mediacenter/news/detail/0,,6252_6207_23,00.html

In June 1994, we secured our first round of financing from Ameritech Development Corp., enabling us to hire more engineers and accelerate our BD development efforts. In addition, a strategic relationship with an off-shore manufacturing partner enabled us to focus on development for volume production platforms and have better understanding of how best to implement certain elements of the BD system. In that process, during the pendency of application claiming the priority of the parent BD application, a chain of continuation and CIP applications were filed in 1994 and 1995. A few of these applications were ultimately abandoned in claim prosecution but surviving continuation applications containing amended and new claims were later issued in additional patent grant.

In February 1996, we were able to attract Motorola Inc. as our strategic partner and as an equity investor[52]. Additional capital was thus made available to further expand product and software development and to fund field trials. We expanded our engineering force further and worked with Motorola on marketing the BD technology to cable system operators. Certain competing whole-house TV solutions using Interdiction methods came to market and presented a competitive threat to the BD system. However, we had reason to believe that some of the fundamental techniques used in such competing systems were actually disclosed in our own parent BD application but we realized that our then pending claims were not properly directed towards such specific techniques. In response, during pendency of an application, a new continuation application filed in 1996 helped obtain additional patent claims directed at competing systems that use elements of our invention.

In early 1997, we announced jointly with Motorola the introduction of their HomeClear™ product based on our BD technology, which we named OmniBand™. The announcement[53] also disclosed a field trial with Time Warner Cable in San Diego. The field trial produced generally positive results but it had also uncovered certain technical problems that had to be corrected by further basic developments. Thus in 1998, after further developments we filed several patent applications unrelated to the BD applications but related to basic resonator and oscillator circuit improvements that were conceived and reduced to practice during the BD development. These applications later issued as four US Patents.

Further development of the basic components needed for the BD system continued and other patent applications were subsequently filed. Despite the technical success of the BD project, our joint efforts with Motorola to market products based on this technology did not succeed since a critical mass of interested cable system operators did not materialize. By 1999, it became clear to us that the BD system would not achieve commercial success and that the Company must abandon the project and find alternative paths for generating revenues and for recovering its R&D investment, or else unwind the Company, close its doors and let all employees go. The company was at a turning point and an alternate business plan was developed and written.

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[52] See archived press release at http://web.archive.org/web/19990507214747/www.mcsi-usa.com/96mar8.htm
[53] See product announcement at http://web.archive.org/web/19981202202200/www.mcsi-usa.com/97mar5.htm

The novelty and applicability of BI's basic technology for applications other than Broadband Descrambling was clear to us and because ongoing development and claim prosecution kept the continuity chain of the BD parent, we filed a continuation application in mid 1998, claiming the novel multicarrier RF signal generation features that have been disclosed in the BD parent application but not claimed thus far. These claims were ultimately issued in a US Patent. Similarly, further continuations with claims directed to certain multichannel quadrature modulation and generation for applications related to head-end RF products were subsequently filed for new derivative products we later brought to market. These were published as a US Patent grant and a published patent application, which is pending. In addition, a currently pending CIP application based on the pending resonator patent application cited above was also filed for circuit elements within certain head-end equipment we developed.

Because many of our inventions contained several novel tools and basic unrelated features that were intended to accomplish certain composite results, we were later able to exploit them in a different setting and market segment of the cable industry. Our company was able to excel in this new segment as an OEM module supplier and acquired several customers. The shift in our company's focus and products from subscriber equipment to head-end equipment could not have been made without the opportunity to appropriate the inventions disclosed years before we knew they would be used in head-end devices. Absent a strong patent protection afforded to us by filing new continuation claims on our original inventions, our investors would have regarded the transition proposition much riskier and would have been reluctant to financially bridge the company through the transition.

In early 2000, based on the new product offering and new business plan for the new market segment, we were able to attract Scientific-Atlanta, Inc. as a major module customer and a new strategic investor who led a new $11M round of financing for the Company[54]. Our sales in the new market segment grew substantially, as recognized in a 2002 regional annual American Electronics Association award for outstanding emerging growth company[55]. The transition to the new market segment was successful. The two market segments and the product migration of BI' technology is shown schematically in the attached figure.

There is no doubt that our ability to continually perfect the protection of our intellectual property by using the continuation/CIP/Divisional practice of the USPTO multiple times was a major success factor. The new claims directed to aspects of our inventions that only became useful in the context of our new market segment were not required or considered when the initial patent applications were filed. Thus, they could not have been anticipated and presented at the initial application phase. However, the relatively unfettered ability to submit them during pendency of prior applications was critical to our company's ability to redirect and protect its technology and survive. Had there been a barrier or uncertainty due to USPTO rules regarding our ability to obtain the new continuation claims required for protecting our new products, the perceived risks to achieving a successful transition to new markets would have been prohibitive. In that event, it is doubtful that our existing investors would have agreed to support us in the transition and there is no doubt that we would not have been able to secure the strategic participation of Scientific-Atlanta and the $11M financing round that they led.

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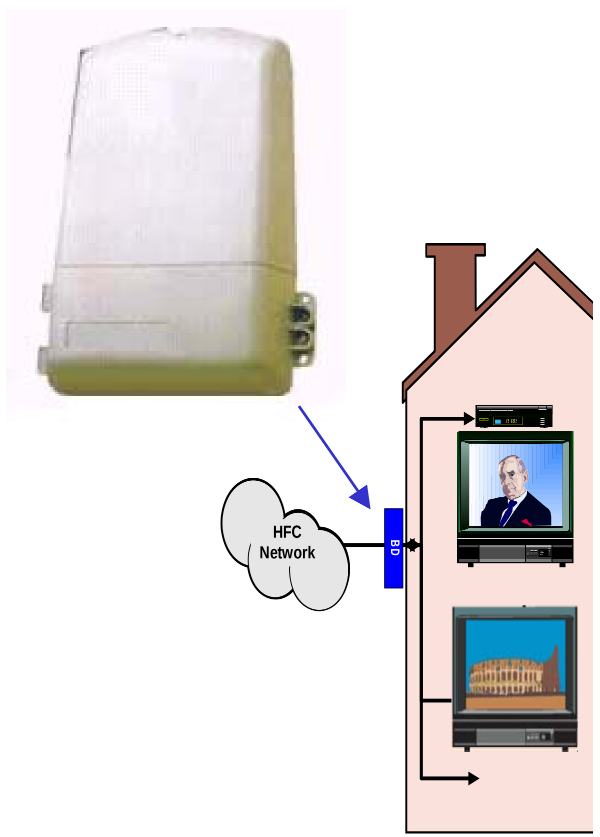
54 See http://web.archive.org/web/20031228172810/www.broadbandinnovations.com/news/newsarchive071900.html

55 See http://web.archive.org/web/20031210051043/www.signonsandiego.com/news/business/20021016-9999_1b16aea.html

BI's survival depended on its ability to use patent continuations to protect a market segment transition

Initial patent claims were directed to core digital RF technologies for multichannel simultaneous TV descrambling in Cable Customer Premise Equipment ("CPE"). **Market period: 1995-1999**.

Several continuation claim cycles directed to digital RF generation and modulation of multichannel signals in Cable Head-End equipment. **Market period: 2000-2005**.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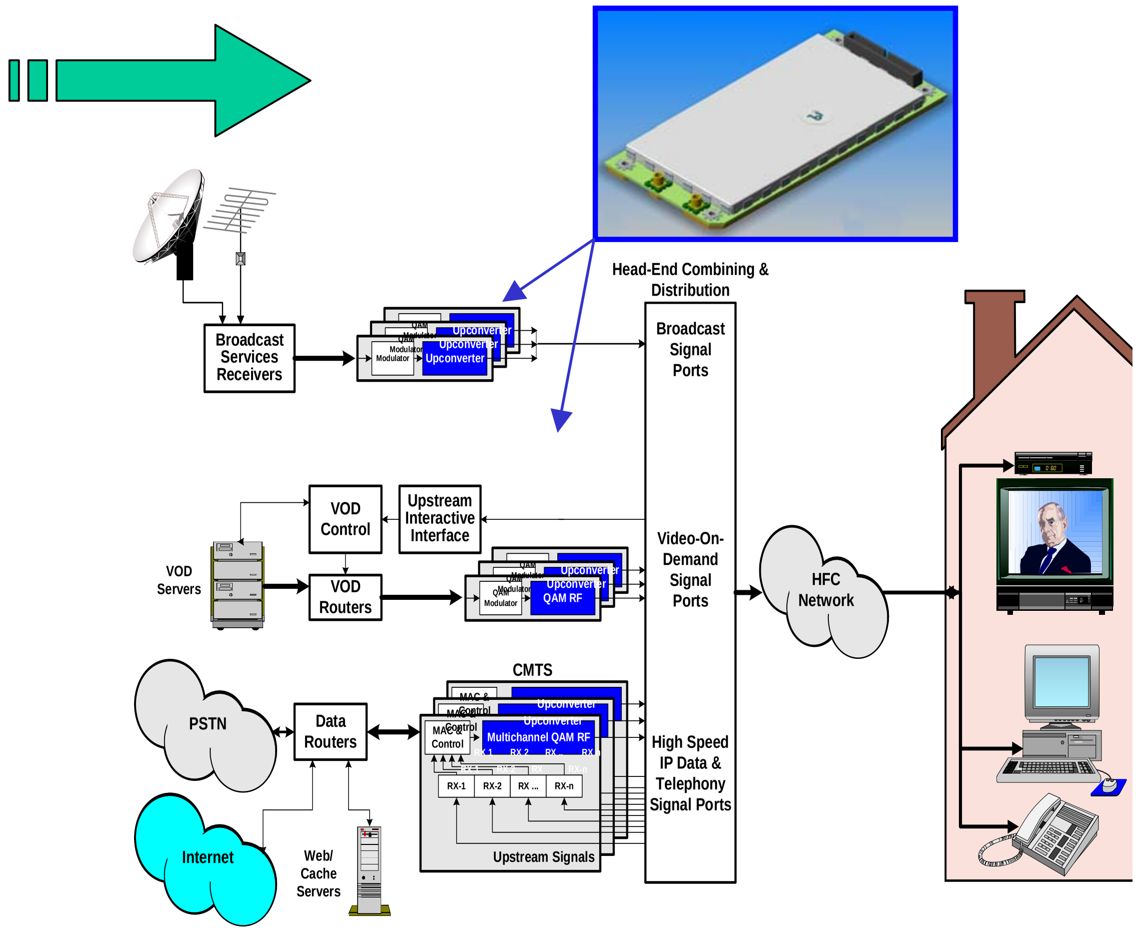
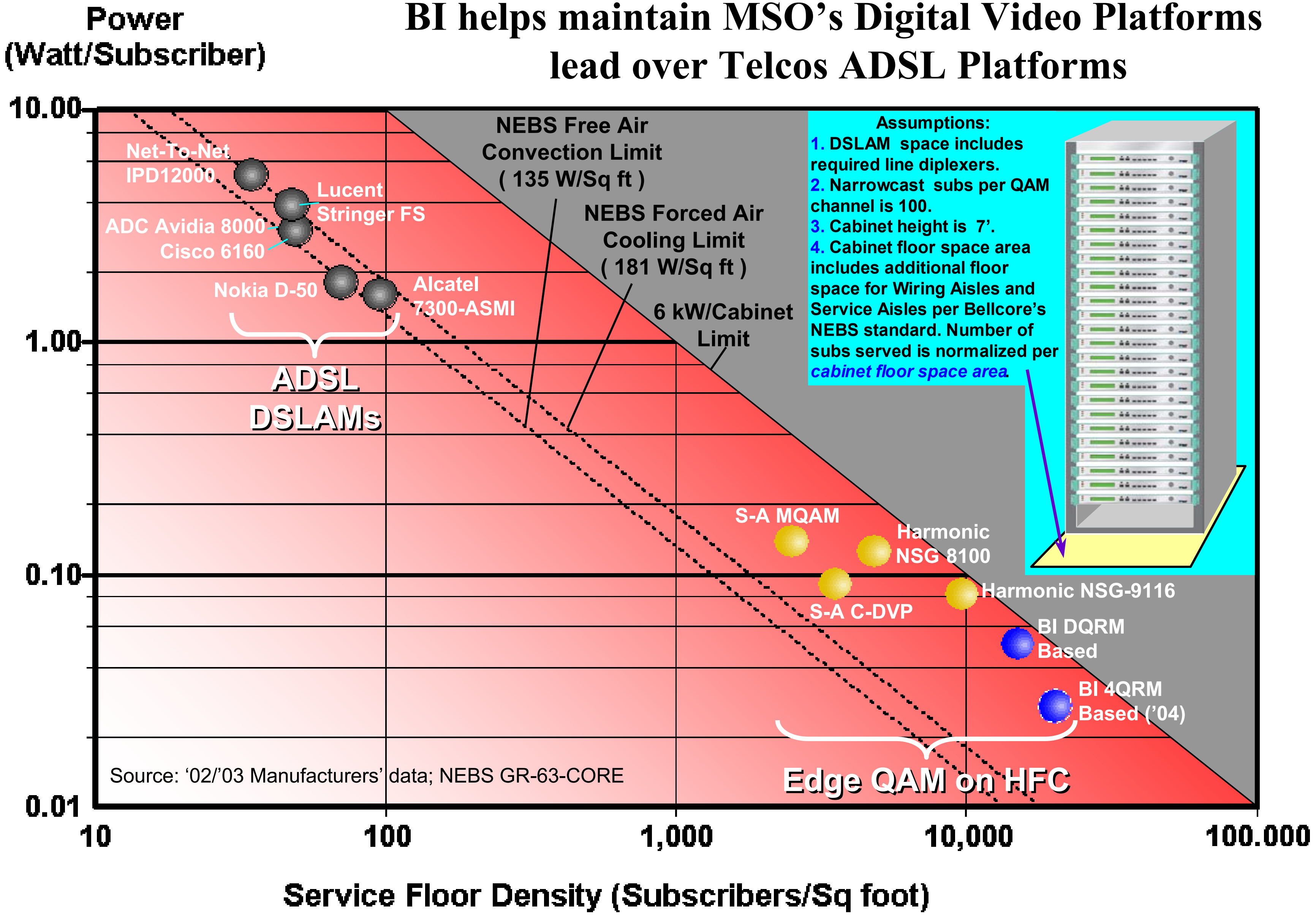
Network
BD


Head-End Combining &
Distribution
Broadcast
Services
Receivers
Upconverter
Modulator
Broadcast
Signal
Ports
VOD
Servers
VOD
Control
Upstream
Interactive
Interface
VOD
Routers
QAM RF
Video-On-
Demand
Signal
Ports
CMTS
PSTN
Internet
Data
Routers
Web/
Cache
Servers
MAC &
Control
Multichannel QAM RF
RX-1
RX-2
RX ...
RX-n
Upstream Signals
High Speed
IP Data &
Telephony
Signal Ports
HFC
Network

Exploitation of BI's early patent applications enabled its later market leadership - A BI Marketing Slide:

BI helps maintain MSO's Digital Video Platforms lead over Telcos ADSL Platforms



Power
(Watt/Subscriber)
10.00
1.00
0.10
0.01
10
100
1,000
10,000
100.000
Service Floor Density (Subscribers/Sq foot)
Net-To-Net
IPD12000
Lucent
Stringer FS
ADC Avidia 8000
Cisco 6160
Nokia D-50
Alcatel
7300-ASMI
ADSL
DSLAMs
NEBS Free Air
Convection Limit
(135 W/Sq ft)
NEBS Forced Air
Cooling Limit
(181 W/Sq ft)
6 kW/Cabinet
Limit
Assumptions:
1. DSLAM space includes required line diplexers.
2. Narrowcast subs per QAM channel is 100.
3. Cabinet height is 7'.
4. Cabinet floor space area includes additional floor space for Wiring Aisles and Service Aisles per Bellcore's NEBS standard. Number of subs served is normalized per cabinet floor space area.
S-A MQAM
Harmonic
NSG 8100
S-A C-DVP
Harmonic NSG-9116
BI DQRM
Based
BI 4QRM
Based ('04)
Edge QAM on HFC
Source: '02/'03 Manufacturers' data; NEBS GR-63-CORE

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